



Computer Education in Nigerian Secondary Schools: Gaps Between Policy and Practice

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Abstract

This study compares Nigeria National Computer Policy (1988) with existing school practice. Policy dictates for computer hardware, maintenance and funding, teaching personnel and training, and computer curriculum were compared.

Information was collected from 20 secondary schools (10 public and 10 private) located in six different states in Nigeria through a questionnaire and interviews of teachers and students were analyzed using descriptive statistics. Comparisons of existing schools' situations revealed that wide gaps existed.

Introduction

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During the 32nd ministerial council meeting of the National Council on Education in 1987, the Federal government of Nigeria decided to introduce computer education into the nation's secondary school system. This was followed by the inauguration of the National Committee on Computer Education the same year.

The functions of the committee include "planning for a dynamic policy on computer education and literacy in Nigeria as well as devising clear strategies and terminologies to be used by the federal and state governments in introducing

computer education” (Nigerian Tribune, April 11, 1988). The general objectives of the policy include:

1. Bring about a computer literate society in Nigeria by the mid-1990s.
2. Enable present school children to appreciate and use the computer in various aspects of life and in future employment. (Report on National Committee on Computer Education, 1988).

According to the National Computer Policy (1988), the first objective is to ensure that the general populace appreciates the impact of information and computer technology on today's society, the importance of its effective use, and the technologies that process, manage, and communicate the information. The second general objective is to ensure that the people of Nigeria will know how to use and program computers, develop software packages, understand the structure and operation of computers and their history, and to appreciate the economic, social and psychological impact of the computer. The modalities and the strategies for achieving the stated objectives include:

1. Training teachers and associated personnel
2. Hardware facilities
3. Curriculum development
4. Software developments and evaluation
5. Maintenance of hardware and peripherals



The policy recommends a continuous evaluation of progress. The starting point of this evaluation is to compare existing school practice with policy stipulations. This will provide a framework for policy revision. Furthermore, in order to adequately respond to the changing needs of the schools, it is necessary for the Ministry of Education, curriculum developers, and teacher trainers to understand existing practice as compared to national goals.

This study answers the following questions:

1. To what extent have the policy objectives been achieved in schools?
2. How congruent is the hardware provision in schools with policy dictates?
3. How available and competent are the teachers compared to policy expectations?
4. What type of teacher development and training is available as compared to policy provisions?
5. To what extent are hardware maintenance, educational software, and curriculum issues consistent with the policy?

Methods of Study

Editor's Note on Nigerian Educational System and

Fifty-four teachers in twenty secondary schools, 10 federal government colleges and 10 private schools, completed a questionnaire and oral interviews were conducted. The questionnaire consisted of four parts with twenty-five items. Five questions concerned general information; such as sex, qualifications, and computer experience, six questions concerned facilities; types of hardware, computer laboratory, and textbooks, eight questions concerned training; proficiency and the number of teaching personnel, and six questions concerned maintenance and funding. Around 200 junior school students were also interviewed regarding their computer competence. The data was then analyzed using descriptive statistics.

Results and Findings

Research Question 1: To what extent have the policy objectives been achieved in schools?

Two fundamental objectives were previously highlighted:

1. To bring about a computer literate citizenry in Nigeria by the mid-1990's
2. To enable present school children to appreciate the potential of the computer and be able to use the computer from Junior Secondary School (JSS) One to Senior Secondary School (SSS) Three

Computer education is still limited to Federal Unity Secondary Schools. It is scarcely offered in any of the state secondary schools, which constitutes more than 80% of Nigerian schools. Though some private schools have introduced computer instruction into their school system, the number of schools that offered computer education is negligible compared to the general schools' population. From the questionnaires, the teaching of computer education in the federal government schools is limited to JSS levels only. However, very few private schools offered it at the SSS level. Almost 80% of the junior school students interviewed agreed that they could not operate computers. Therefore, the use of computers in education is rare in Nigerian schools. Also, the computer literate citizenry envisaged almost a decade ago is still a mirage. Very few school

Languages:

Nigerian school children attend primary school from the ages of 6 to 12. The next three years students attend Junior Secondary School (JSS) followed by another three years of Senior Secondary School (SSS) thus graduating when they are 18 years old. In 1999, the Nigerian education policy mandated JSS as the minimum educational level for all students. Since this policy is fairly new many students have not yet reached this level and a considerable percentage of Nigerian citizens are still illiterate.

There are around 250 ethnic groups in Nigeria with many diverse languages. But largely speaking, there are three major languages. The most prominent is Hausa and the remaining others are Yoruba and Igbo, however English is the official language of Nigeria.

(Information based on correspondence with the authors)

children have the opportunity to experience any type of computer instruction in school.

Research Question 2: How congruent is the hardware provision in schools with policy dictates?

Policy dictates 8 personal computers per school. This number is calculated based on the assumption that each computer class comprises 40 students or one computer for every 5 students. Policy further stipulates the following as the standard computer configuration for schools:

1. The 16-bit microprocessor (INTEL compatible)
2. Monochrome graphics monitors
3. 2 floppy diskette drives
4. 640 KB memory capacity
5. Standard keyboard which is suitable for graphics and word- processing
6. MS-DOS version 3.0 and above
7. 80-column Printer

To determine the congruency of school practice with these stipulations, the number and type of computers in schools were obtained.

Table1: Computer Hardware Facilities

No. of Working Computers	No. of Schools			Percentages		
	Private	Public	Total	Private	Public	Total
0 – 2	2	2	4	20	20	20
3 – 5	2	6	8	20	60	40
6 - 8	2	2	4	20	20	20
9 – 11	3	0	3	30	0	15
12 and above	1	0	1	10	0	5
Total	10	10	20	100	100	100

From Table 1, about 80% of schools have at least five computers. The 8 computers per school policy is not the reality in these schools. The accepted computer class number in schools is 40 according to the policy, but public schools greatly exceed this number with an average class membership of almost 50. Thus the current student-computer ratio of 10:1, which is the case in public schools, is far from the policy stipulation. Furthermore the computer configurations dictated by the policy are now obsolete as indicated in Table 2.

Table 2: Computer Hardware Types in schools.

Types of Computer Systems	No. of Computers			Percentages		
	Private	Public	Total	Private	Public	Total
IBM Compatibles (old versions i.e. PBC Acorn, 486)	56	22	78	74	69	72
Gateway 2000 (Pentium 233)	6	0	6	8	0	6
Compaq(Pentium 233)	13	0	13	17	0	12
(Pentium 233)	0	5	5	0	16	5
Apple 2E	1	5	6	1	16	6
Total	76	32	108	100	100	100



It is obvious that the majority of the computers in schools are outdated. However, this is not much of a deviation from the policy which dictates the use of obsolete computers. This was not the case at the time of policy formulation and is an indication that the policy itself is long overdue for revision. It does seem that the greater portion of computers in schools were procured many years ago when computer innovations were first introduced.

Research question 3: How available and competent are the teachers compared to policy expectations?

The policy dictates that three teachers be selected from each of the pilot schools to be trained as the computer teaching personnel. These teachers should preferably come from mathematics, physics or chemistry when specialists are not readily available. One of each team of three teachers should be trained as the lead teacher in each school. The government further directs that qualified graduates in computer education should be employed in the schools when possible. Table 3a indicates the teacher qualifications that were observed.

Table 3a: Computer Teachers' Qualifications

Qualification	Number			Percentages		
	Private	Public	Total	Private	Public	Total
Computer Graduates	3	9	12	11	33	22
Computer with Education Graduates	3	6	9	11	22	17
National Certificate in Education (N.C.E.)	3	2	5	11	8	9
Degrees in Allied Courses	14	10	24	42	37	44
Others (i.e. OND/HND)	4	0	4	15	0	7
Total	27	27	54	90	100	100

Twenty two percent (22%) of the teachers have no teaching qualifications. The Computer with Education Graduates are mainly those that have an education degree in other subject areas but a postgraduate diploma in Computer Science. They constituted 17% of the computer teaching force. Holders of a National Certificate in Education (N.C.E.) constituted the least while holders of degrees in allied courses such as mathematics, physics, physics education, mathematics education, economics and geography constituted the majority of the computer teachers. Around 17% of teachers observed were truly qualified computer education teachers. Teachers of computer education are expected to be proficient in LOGO and BASIC as these are the programming languages stipulated by the policy. The number of teachers indicating proficiency in these languages is stated in Table 3b.

Table 3b: Computer Teachers' Programming Language Proficiency

Programming Language	Number			Percentages		
	Private	Public	Total	Private	Public	Total
BASIC	26	24	51	96	83	89
LOGO	0	5	5	0	17	9
None	1	0	1	4	0	2
Total	27	30	57	100	100	100

The majority of the teachers, whether private or public, are proficient in BASIC programming. Very few teachers are proficient in LOGO programming.

Research Question 4: What type of teacher development and training is available as compared to policy provisions?

The policy views logistics for training from two perspectives. First, the initial basic training for teachers in pilot schools for the computer education take-off, which was held between October 25th and December 16th 1988, at the National Teachers' Institute in Kaduna. The second is a refresher or improvement course for computer teachers in schools. Less than 30% of the observed teachers admitted having any in-service training. Around 75% of the observed teachers in public schools and 66% of the observed teachers in private schools expressed that they have had no in-service training in computer education. Also, the in-service training promised by the policy for all federal unity schools teachers on computer-aided instruction was never held.

Research Question 5: To what extent are hardware maintenance, educational software, and curriculum issues consistent with the policy?

The policy provides for routine minor repairs and maintenance to be carried out by a limited number of computer teachers on the computers. It further provides for maintenance work to be carried out by technicians, giving unity schools regular access to repair services. The policy directs that educational software centers should be used to collect educational software for review and evaluation and to develop educational software. No technical center within the country has been established for service or equipment repair and maintenance. Table 4 shows the regularity of computer maintenance and repair in all the schools.

Table 4: Computer Maintenance in Schools

Computer Maintenance	Number			Percentages		
	Private	Public	Total	Private	Public	Total
Regularly maintained	1	10	11	10	100	55
Seldom maintained	8	0	8	80	0	40
Never maintained	1	0	1	10	0	5
Total	10	10	20	100	100	100

Public school computers were hardly ever maintained while the observed private schools reported 100% regular maintenance. Results further show that in the few cases that maintenance was reported by public schools, that teachers were the ones who carried out these repairs the majority of the time (60%), however, sometimes computer firms were used (40%). Computer firms carried

out all of the maintenance reported by private schools.

With regard to educational software, no software development or evaluation centre has been established. Computer aided instruction does not happen in any of the public schools but minimally exists in at least 10% of the private schools. Thus little need (if any) is felt to procure any educational software. Even if the need for educational software becomes apparent, inadequate funding becomes a major inhibition.

Up until now, the promised curriculum is yet to be made available to schoolteachers. What is available in schools is the new computer education syllabus for JSS1 to SSS3, which is being limitedly implemented in public schools. The content of the syllabus is however consistent with the policy aims and objectives.

Conclusion and Recommendations

There is a wide disparity between policy pronouncements and policy implementations in Nigeria (Jeter, 2002). The Minister for Science and Technology, Professor T. Isoun, was mindful of this when he posited that the formulation of an information technology (IT) policy constituted only about 20% of the IT solution for the country, but the remaining 80% lies with implementation (2001). Therefore, a body was inaugurated to carry out the much larger task of implementation. The Federal Ministry of Education in Nigeria needs to follow suit and form a body that will regulate, monitor, evaluate and verify progress on an on-going basis. The Ministry should be mindful of the reality that educational policies of the past have failed due to poor implementation.

The enthusiasm with which the minister's address was received did not produce the necessary actions (Odogwu, 2000). It seems as if the policy has disappeared with its formulators. Maduekwe (2003) offered a solution to this by calling for the emergence of a 'policy elite' that would act as an informed lobby group to the government, stressing the need for policy implementation. He stated that the emergence of such a policy leadership group would ensure that the policies of previous administrations would not be abandoned. This agrees with Braun, Cicioni and Ducste (2000) suggestions regarding policy implementation in developing countries. Considering Argentina's situation, Braun et al. (2000) called for the emergence of policy 'think tanks' whose function is to conduct policy analysis and offer creative, insightful and even counter-intuitive solutions for complex problems. Think tanks can act both in partnership and as a counter balance to governmental agencies. In many cases they complement and build on the work of public organizations, act as watchdogs, and are alternative sources of policy initiatives. Dunn (1996) in the case of Central and Eastern Europe think tanks, unencumbered by political obligations and driven by core values and principles, act as independent forums for debate and as sources of innovative ideas and recommendations. Policy continuity would thus be ensured if policy elites or think tanks emerge in Nigeria (Freedom House, 1999).

To bridge the gap, both policy and practice need to be implemented. The current policy pronouncements are obsolete and need to be updated within the dynamic world of computers. For example, hardware configurations of 16-bit microprocessor, 640 KB memory capacity and 80 - column printer stated in the policy are outdated. The updated policy must be popular and deliverable to all

computer teachers in schools so that the teachers will be able to implement the philosophy and objectives of the computer instruction.

Regular in-service training for teachers must be in place that includes basic computer operations, programming and teaching methodologies. The training should be made open to private schools as well to ensure uniform standards. In addition, most teachers need retraining in integrating IT techniques into instructional methods. Chen (1995) outlined what this training should include:

- Basic computing skills
- Up-to-date theories of learning and instruction
- Wide ranging applications of IT in education
- IT trends in education and common mistakes of computer use in education
- Software evaluation methods and classroom technology integration

This goes beyond the responsibility of the Federal Ministry of Education. State Ministries of Education within the country should offer training for school teachers and ally with various institutes of education in universities whose primary assignments are the professional development of teachers. This would involve adequate budgetary allocations for such programs.

Furthermore, deliberate effort should be made by the government to fund new hardware to at least meet the stipulated 8-1 student to computer ratios. Making hardware available is a governmental priority. Mozambique's IT priority has established 'Information Technology Access Mobile Units' in the form of buses carrying computers for use by interested people in those areas where infrastructure is not yet available. A similar arrangement can be put in place for schools. A single school computer laboratory can be fully equipped so that other schools within the same area can use it on a rotating basis. For private schools, compliance with the policy hardware provisions should form the basis of school accreditation.

The shortage of teachers is a national problem but designated colleges of education and universities should be assisted in the formulation of successful computer education programs so that within a few years qualified computer teachers will be available to schools. It is difficult and expensive to service and repair computers using computer firms because schools are dispersed all over the nation and computing firms are located only in the cities. It may be necessary to employ computer technicians in state offices of the Federal Ministry of Education so that schools can share as the need arises. Private schools will only have the option of resorting to computer firms.

Above all, adding computer studies examinations in Junior School Certificate Examinations as well as Senior School Certificate Examinations will catalyze serious commitment. Cameroon, for example, has introduced computer education as an examinable subject at the General Certificate of Education Level (Onabanjo, 1997) which has increased computer awareness. Putting these types of practices in place will reduce; if not entirely close the gap between policy stipulations and school practice.

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